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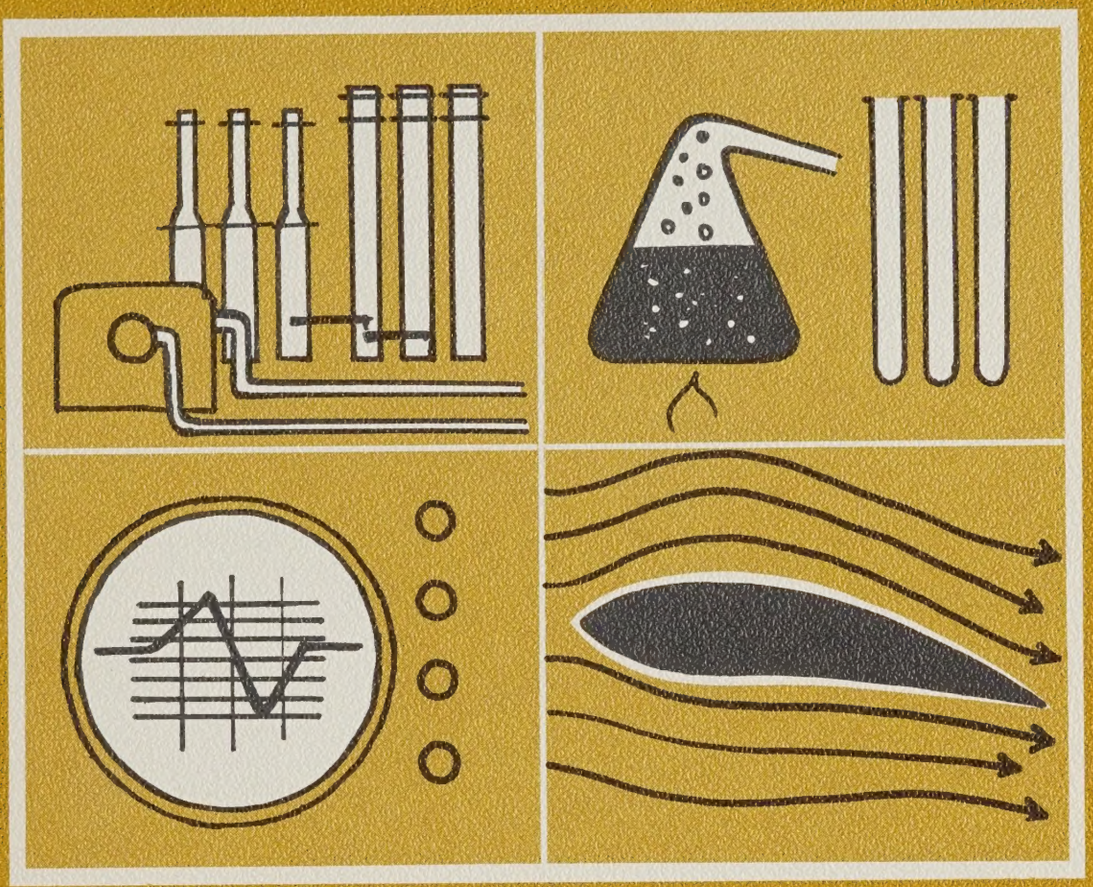

SCIENCE, TECHNOLOGY & TRADES

volume 3

EDUCATIONAL TELEVISION SERIES 1967-68

Educational Television Branch
ONTARIO DEPARTMENT OF EDUCATION
1670 Bayview Avenue/Toronto 17

program schedule

SCIENCE, TECHNOLOGY AND TRADES

24 programs of 20 minutes each

PROGRAM NO.	CBC 9:40	CBC 9:30 REPEAT	CBOT 9:40	CHCH 9:40	CJOH CJSS	CKCO 9:00	CKCO 9:00 REPEAT
1	Oct. 16	Oct. 20	Oct. 17	Oct. 26	Oct. 19	Oct. 23	Oct. 27
2	Oct. 23	Oct. 27	Oct. 24	Nov. 2	Oct. 26	Oct. 30	Nov. 3
3	Oct. 30	Nov. 3	Oct. 31	Nov. 9	Nov. 2	Nov. 6	Nov. 17
4	Nov. 6	Not Shown	Nov. 7	Nov. 16	Nov. 9	Nov. 13	Not Shown
5	Nov. 13	Nov. 17	Nov. 14	Nov. 23	Nov. 16	Nov. 20	Nov. 24
6	Nov. 20	Nov. 24	Nov. 21	Nov. 30	Nov. 23	Nov. 27	Dec. 1
7	Nov. 27	Dec. 1	Nov. 28	Dec. 7	Nov. 30	Dec. 4	Dec. 8
8	Dec. 4	Dec. 8	Dec. 5	Dec. 14	Dec. 7	Dec. 11	Dec. 15
9	Dec. 11	Dec. 15	Dec. 12	Dec. 21	Dec. 14	Dec. 18	Jan. 12
10	Dec. 18	Not Shown	Dec. 19	Jan. 11	Dec. 21	Jan. 8	Not Shown
11	Jan. 8	Jan. 12	Jan. 9	Jan. 18	Jan. 11	Jan. 15	Jan. 19
12	Jan. 15	Jan. 19	Jan. 16	Jan. 25	Jan. 18	Jan. 22	Jan. 26
13	Jan. 22	Jan. 26	Jan. 23	Feb. 1	Jan. 25	Jan. 29	Feb. 2
14	Jan. 29	Feb. 2	Jan. 30	Feb. 8	Feb. 1	Feb. 5	Feb. 9
15	Feb. 5	Feb. 9	Feb. 6	Feb. 15	Feb. 8	Feb. 12	Feb. 23
16	Feb. 12	Not Shown	Feb. 13	Feb. 22	Feb. 15	Feb. 19	Not Shown
17	Feb. 19	Feb. 23	Feb. 20	Feb. 29	Feb. 22	Feb. 26	Mar. 1
18	Feb. 26	Mar. 1	Feb. 27	Mar. 7	Feb. 29	Mar. 4	Mar. 8
19	Mar. 4	Mar. 8	Mar. 5	Mar. 14	Mar. 7	Mar. 11	Mar. 15
20	Mar. 11	Mar. 15	Mar. 12	Mar. 28	Mar. 14	Mar. 25	Mar. 29
21	Mar. 25	Mar. 29	Mar. 26	Apr. 4	Mar. 28	Apr. 1	April 5
22	Apr. 1	Apr. 5	Apr. 2	Apr. 11	Apr. 4	Apr. 8	April 19
23	Apr. 8	Apr. 19	Apr. 9	Apr. 18	Apr. 11	Apr. 22	April 26
24	Apr. 22	Apr. 26	Apr. 16	Apr. 25	Apr. 18	Apr. 29	May 3

SCIENCE, TECHNOLOGY AND TRADES – Volume 3

A series of 5 programs of 20 minutes each on Industrial Chemistry, Industrial Physics and The Integrated Course Concept in Technical Education for Students in grade 10.

This is Volume 3 of a three-volume series. Programs 11 to 19 were contained in Volume 2.

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general introduction

The final five telecasts in the 1967-68 Science, Technology and Trades Series serve to introduce *Industrial Chemistry, Industrial Physics,* and *The Integrated Course Concept in Technical Education* to grade ten students.

The first four programs are intended to acquaint the students with the new courses which are being introduced in some schools at this time. It should be pointed out that *Industrial Chemistry* has been offered for several years in a few schools, and that the curriculum being developed utilizes the valuable experience gained in practice in these schools.

A course outline for the five-year *Industrial Physics* course has been prepared and published. This will be followed by a curriculum guide presently being printed.

The broadcasts are directed at grade ten students to aid them in selecting their major technical subject in those schools where these courses are offered, either presently or in the near future. Further, it is hoped that the telecasts will stimulate an interest in implementing these courses in other schools.

The final program in the series explains the *Integrated Course Concept.* Insofar as many schools will offer Integrated Courses in September, 1968, this program will be of particular benefit to students attending those schools. This program is also directed toward school trustees, administrators and educators to acquaint them with the progress being made in Integrated Courses.

INDUSTRIAL CHEMISTRY

program twenty

THE TECHNICIAN

The purpose of this program is to show chemistry in industry and to explain the duties of the chemical technical worker.

PROGRAM CONTENT

The broadcast opens with a humorous explanation of the benefits of chemistry enjoyed by our society. The three main areas of activity in chemistry; research and development, quality control, and technical services to the customer, are examined. Case studies of three young people, of diverse educational backgrounds, are presented. Each of the young people shown explains in his or her own words one facet of his or her job and area of responsibility in the chemical laboratory or plant. These case studies demonstrate that learning must continue beyond formal education. In-service courses sponsored by The Association of Professional Engineers and The Chemical Institute of Canada, are mentioned as a means of upgrading the technician after he has begun work.

SUGGESTED PRE-VIEWING ACTIVITIES

1. Ask the students to name products which *do not* involve chemistry directly or indirectly. This negative approach may serve to demonstrate the importance of chemistry in industry.
2. List on the chalkboard the three main groups of chemical laboratory workers: chemists and chemical engineers, chemical technologists, and chemical technicians.
3. If possible, suggest to grade ten students that they have their parents watch the telecast, particularly if a course in Industrial Chemistry is offered at your school.

SUGGESTED POST-VIEWING ACTIVITIES

1. With reference to the chalkboard list, discuss the educational background required for each group of chemical workers.

   Point out the various ways of acquiring certification in each area. (C.I.C. courses, ATEC courses, formal education at university and Colleges of Applied Arts and Technology. This information should be available from your Guidance Department).
2. Introduce the recommended Industrial Chemistry Course entrance requirements at your school; proficiency in mathematics, science, and English.

program twenty-one

HERE'S HOW

The purpose of this telecast is to explain the Industrial Chemistry Course in the four or five year Science, Technology and Trades program and to demonstrate its value as a basis for further formal study or for employment in industry.

PROGRAM CONTENT

The first half of the telecast shows student activity in an *Industrial Chemistry* classroom and laboratory. An explanation of the course content is made by showing students performing routine tests in the laboratory. Emphasis is placed on the fact that much of the activity is carried out by the students without the participation of the teacher. Safety is emphasized throughout.

The second half of the telecast shows that the advancement of instrument technology has transformed much of the work in the chemistry laboratory from wet chemistry to instrumental chemistry. The major modern instruments for chemical analysis are shown in use in the research department of a major oil company. Each instrument's function, operation and cost is mentioned. It is hoped that by emphasizing the cost and complexity of the instruments, the student will be convinced that the chemical technologist must be a skilled and responsible worker. Additional skills and knowledge above a basic knowledge of chemistry, are required by most chemical laboratories. An examination of the elaborate pilot plants which are assembled by the chemical technicians demonstrates their need for manual dexterity and mechanical aptitude.

SUGGESTED PRE-VIEWING ACTIVITIES

1. Discuss briefly program twenty to emphasize the opportunities available to the student who majors in *Industrial Chemistry.*
2. List on the chalkboard the instruments which will be shown in the analytical laboratory.
   - the Mass Spectrometer.
   - the Nuclear Magnetic Resonance machine.
   - the X-Ray Diffraction and Fluorescence equipment.
   - the Infra red Spectrometer.
   - the Electron Microscope.

   Note: The Gas Chromatograph was explained in program twenty. It might be added to the list.
3. Point out that the work of an analytical laboratory is essentially *detective work.* The graphical, film, and digital readouts produced by the analytical instruments provide *fingerprints* which identify materials or their components.

SUGGESTED POST-VIEWING ACTIVITIES

1. Discuss the differences between *Industrial Chemistry* as a *technical* subject and the *regular* chemistry course offered to all technical students.
2. Discuss in detail the extra skills which a chemical technician or technologist requires. Possibly list these on the chalkboard.
3. Discuss in detail the function and operation of the analytical instruments shown in the telecast. (For Industrial Chemistry majors).

introduction to Industrial Physics

The two programs on industrial physics are closely integrated and it is recommended that both should be viewed and in sequence. While the aircraft industry is used as a rich example of how physical principles are evident, not only in production but also in the machines of production, it should be emphasized that physics is applied in *all* industries. Even the simplest apparatus or machines inevitably involve physical concepts and laws.

INDUSTRIAL PHYSICS

program twenty-two

APPLIED PHYSICS IN INDUSTRY – PART I

The purpose of this program is to introduce the Industrial Physics Course and to show that applications of physical principles permeate industrial activity.

PROGRAM CONTENT

The opening sequence describes the four main divisions of activity incorporated in the Industrial Physics Course of Study: *Mechanics of Materials, Hydraulics and Pneumatics, Instrumentation* and *Electricity.*

This is followed by several sequences describing the testing and examination of materials used in the fabrication of aircraft. Many of these tests are carried out by the metaturgical technologist in the Quality Control Laboratory. X-ray and ultra-sonic apparatus is shown being used to check both raw materials and fabricated parts.

Hydraulic and pneumatic actuated tools and instruments are examined. Finally, a leak test on a wing tank is shown.

SUGGESTED PRE-VIEWING ACTIVITIES

It is suggested that the teacher point out to the students the following:

1. *Physics* is the basic science and therefore one should expect to find physical laws operating in every piece of hardware–from plumbing fixtures to space vehicles.
2. The limitations of technology are really the limitations of our knowledge of materials.
3. Fifty per cent or more of the production machines are equipped with fluid power, either hydraulic or pneumatic.
4. Instrumentation involves both measurement *and* control. For example, closed-loop systems involve the sensing and control of physical processes.
5. There is a great demand in industry today for people who can work intelligently with a wide range of electro-mechanical devices which are inherent in any automated or semi-automated process.

SUGGESTED POST-VIEWING ACTIVITIES

Since this program is intended to introduce the subject *Industrial Physics* to grade ten students, with a limited background, the teacher may choose to limit the post-viewing activity to a discussion of the program content. Possibly a review of the Industrial Physics Course content might be made.

program twenty-three

APPLIED PHYSICS IN INDUSTRY – PART II

The purpose of this program is to show further examples of the application of physical laws and concepts in industry.

PROGRAM CONTENT

Whereas program twenty-two showed tests involving physical principles being carried out during the production of aircraft parts, this program shows the many destructive tests carried out on the members of finished aircraft. These tests simulate actual flying conditions and subject the parts to the most rigorous activity possible. Wings are vibrated, loaded, and flexed continually until failure occurs. The program shows fatigue tests on the principal airframe parts as well as drop-tests of landing gear. All these tests are carried out to ensure the complete safety of the aircraft. A brief examination of some of the aircraft instrumentation completes the telecast.

SUGGESTED PRE-VIEWING ACTIVITIES

1. Review the Course Content headings of the Industrial Physics Course.
2. Emphasize that while the aircraft industry is used as an example, the applications of physical principles are evident in all industries.

SUGGESTED POST-VIEWING ACTIVITIES

A discussion of the program content with emphasis on the physical laws and concepts demonstrated in the program should suffice.

THE INTEGRATED COURSE CONCEPT

program twenty-four

TEACHING FOR TECHNOLOGY

The purpose of this program is to define the Integrated Course Concept and to explain the reasons for the introduction of Integrated Courses.

PROGRAM CONTENT

This television program is simply a visual elaboration of *The Restructuring Proposal for Secondary School Technical Courses* which was issued by the Department of Education, February, 1967.

SUGGESTED PRE-VIEWING ACTIVITIES

The only pre-viewing activity which might be useful would be a careful study of the document mentioned above.

You might suggest to your students that they have their parents view the program.

SUGGESTED POST-VIEWING ACTIVITIES

Discuss the program in the light of those integrated courses offered at your school.

FOR OPTIMUM VIEWING CONDITIONS

1. Review Teachers Guide well in advance of each telecast.
2. Have the set on and adjusted, sound off before the program begins.
3. Have suggested materials ready.
4. Be sure that you can observe both the program and your students' reactions during the telecast.
5. Assure student comfort by
   — locating the set for best viewing,
   — eliminating glare and reflection,
   — ventilating room properly,
   — placing seats within 20′ of the screen.

This diagram shows the suggested placement of the television set: